FEEDBACK AMPLIFIER WITH CLOSED LOOP

AIM:

Design a two-stage operational amplifier with the first stage as a differential amplifier with active load for a gain of 30V/V and the second stage as a CS Amplifier with a gain of 20V/V. Assume I SS =0.1mA, V GS =0.7V, V th =0.4V and consider suitable technology parameters values.

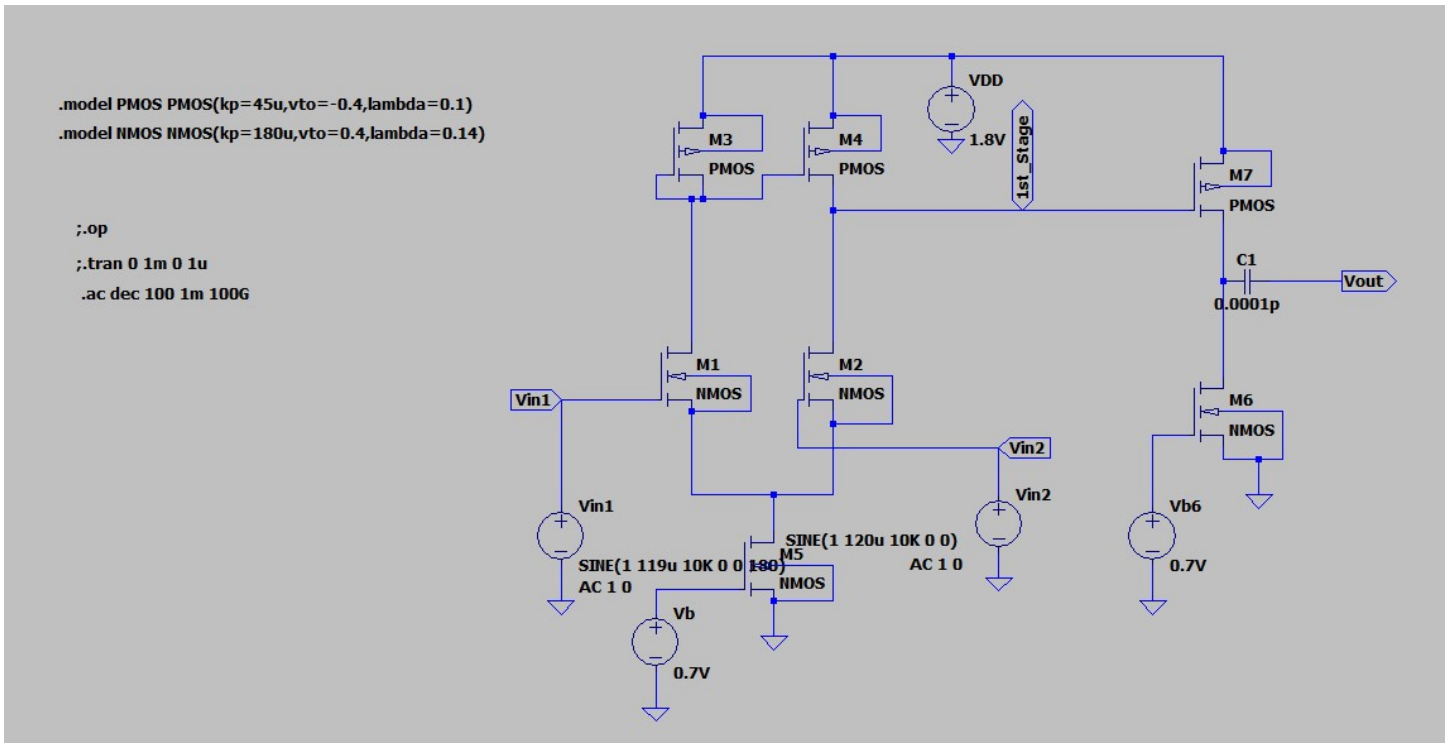
i) Compare the result with LTSPICE Simulation.

ii) Perform the transient analysis of the same.

APPARATUS REQUIRED:

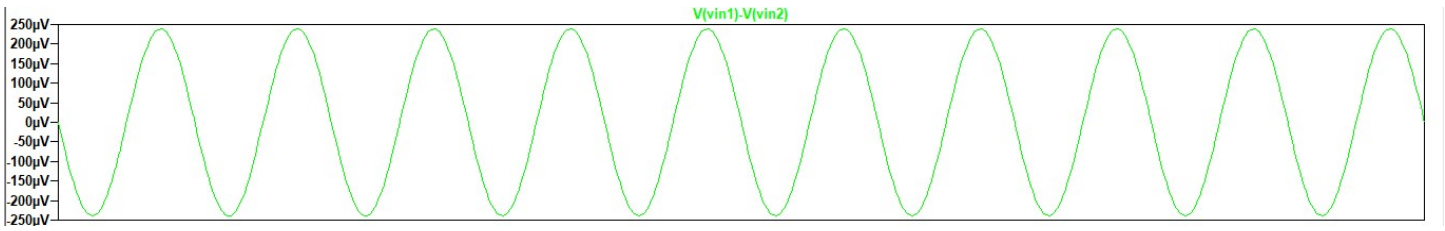
LTSpice Software.

Circuit:

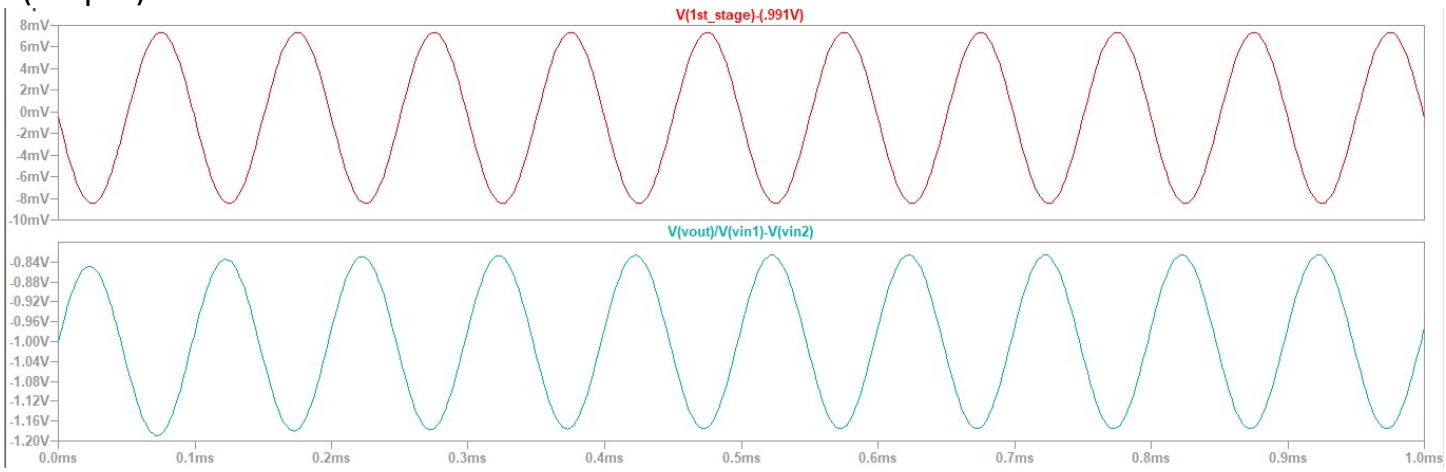


Output:

Vinput



V(output)



Transfer Function:

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      --- Operating Point ---

V(n001):        1.8             voltage
V(n002):        0.990444        voltage
V(1st_stage):   0.990444        voltage
V(vin2):        1               voltage
V(n004):        0.329224        voltage
V(vin1):        1               voltage
V(n006):        0.7             voltage
V(n003):        0.599478        voltage
V(vout):        5.99478e-017    voltage
V(n005):        0.7             voltage
Id(M6):         0.000108321     device_current
Ig(M6):         0               device_current
Ib(M6):         -6.09478e-013   device_current
Is(M6):         -0.000108321    device_current
Id(M5):         0.00010454      device_current
Ig(M5):         0               device_current
Ib(M5):         -3.39224e-013   device_current
Is(M5):         -0.00010454     device_current
Id(M1):         5.22699e-005    device_current
Ig(M1):         0               device_current
Ib(M1):         -6.7122e-013    device_current
Is(M1):         -5.22699e-005   device_current
Id(M2):         5.22699e-005    device_current
Ig(M2):         0               device_current
Ib(M2):         -6.7122e-013    device_current
Is(M2):         -5.22699e-005   device_current
Id(M7):         0.000108321     device_current
Ig(M7):         -0              device_current
Ib(M7):         1.21052e-012    device_current
Is(M7):         -0.000108321    device_current
Id(M3):         5.22699e-005    device_current
Ig(M3):         -0              device_current
Ib(M3):         8.19556e-013    device_current
Is(M3):         -5.22699e-005   device_current
```

RESULT:

The circuit is implemented and the gain of 600 V/V is attained.